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EXAMINER

BRIGGS, NATHANAEL R

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary	Application No. 10/508,859	Applicant(s) OGUCHI ET AL.	
	Examiner Nathanael R. Briggs	Art Unit 2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/24/04; 2/21/07</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okabe et al. (US 6,280,799) in view of Swirbel et al. (US 5,328,728).**
4. Regarding claim 1, Okabe discloses a method for manufacturing an LCD (see figure 5, for instance), wherein spacer particles (19) are located at an arbitrary position on a substrate (16) by ejecting a dispersion of spacer particles (11) by an ink-jet method, a diameter D_1 (column 6, lines 42-46) of an adhered droplet of said dispersion (11) of spacer particles, having adhered to said substrate, and a diameter D_2 (column 6, lines 55-58) of the adhering spacer particles (19), satisfying a relationship of the following equation: $D_2 < (D_1 \cdot 0.5)$. However, Okabe does not expressly disclose wherein the dispersion of particles is evaporated upon touching the substrate.
5. Regarding claim 1, Swirbel discloses a method for manufacturing an LCD (see figures 3 and 4, for instance), wherein the particle dispersion (35) is evaporated upon touching the substrate (column 2, lines 1-8).

6. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the technique of Swirbel in the method of Okabe. The motivation for doing so would have been to maintain a uniform particle distribution while minimizing any visible residue from particles being present, as taught by Swirbel (column 2, lines 4-6; column 5, lines 20-22). Claim 1 is therefore unpatentable.

7. Regarding claim 2, Okabe in view of Swirbel discloses the method for manufacturing an LCD (see Okabe figure 5, for instance) of claim 1, and Okabe further discloses wherein the surface temperature, (held at room temperature, 25°C, (column 12, line 62)) of a substrate (16) at the time when a dispersion (11) of spacer particles adheres to the substrate is at least 20°C lower than a boiling point (column 9, lines 4-9) of a liquid having the lowest boiling point (150°C) among liquids contained in said dispersion (11) of spacer particles. Claim 2 is therefore unpatentable.

8. Regarding claim 3, Okabe in view of Swirbel discloses the method for manufacturing an LCD (see Okabe figure 5, for instance) of claim 1, and Okabe further discloses wherein the surface temperature of a substrate at the time when a dispersion of spacer particles adheres to the substrate is at least 20°C lower than a boiling point (column 9, lines 4-9) of a liquid having the lowest boiling point among liquids contained in said dispersion (11) of spacer particles, and the surface temperature of a substrate is 25°C (room temperature, column 12, line 62) during a time period until the dispersion (11) of spacer particles is completely evaporated. Claim 3 is therefore unpatentable.

9. Claims 4-6 and 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okabe et al. (US 6,280,799) view of Swirbel et al. (US 5,328,728), as applied to claims 1-3 above, and in further view of Hirose et al. (US 6,501,527).

10. Regarding claims 4-5 and 14-17, Okabe discloses a method for manufacturing an LCD (see figure 5, for instance) according to claims 1-3. However, Okabe in view of Swirbel does not expressly disclose a dispersion of spacer particles, wherein a dispersion of spacer particles comprises a medium containing methyl methacrylate in an amount of 10 to 80% by weight and ethylene glycol in an amount of 10% by weight, and spacer particles, and the content of said spacer particle is 0.1-30% by weight.

11. Regarding claims 4-5 and 14-17, Hirose discloses a dispersion of spacer particles (see figure 12, for instance), wherein a dispersion of spacer particles (18) comprises a medium containing methyl methacrylate (Examiner takes Official Notice that the boiling point of methyl methacrylate is 100° C) in an amount of 10 to 80% by weight (column 16, line 21) and ethylene glycol (Examiner takes Official Notice that the boiling point of ethylene glycol is 197° C) in an amount of 10% (column 16, line 23) by weight, and spacer particles (15), and the content of said spacer particle is 0.1-30% by weight (column 9, lines 50-52).

12. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the method of dispensing particles of Hirose in the dispersion of Okabe in view of Swirbel. The motivation for doing so would have been to minimize the influence of spacer particles on display quality, in order to cost-effectively produce an

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LCD with excellent display quality with, as taught by Hirose (column 2, lines 20-25).

Claims 4-5 and 14-17 are therefore unpatentable.

13. Regarding claims 6 and 18-19, Okabe in view of Swirbel and in further view of Hirsoe discloses the method for manufacturing an LCD (see Hirose figure 12, for instance) of claims 1-5, and 14-17, as applied above, and Hirose further discloses wherein the dispersion of spacer particles (18) has a contact angle appearing to be within the range of 25 to 70°, in light of Figure 12, relative to an orientation layer (5) on a substrate (1). Claims 6 and 18-19 are therefore unpatentable.

14. Claims 11-13 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okabe et al. (US 6,280,799) in view of Minamino et al. (JP 11-223821).

15. Regarding claim 11, Okabe discloses a dispersion of spacer particles (see figure 5, for instance), which comprises spacer particles in which a vinyl-based thermoplastic resin, formed by free radical polymerizing vinyl-based monomers having a hydrophilic functional group or vinyl-based monomers having a hydrophilic functional group and an alkyl group having 3 to 22 carbon atoms (column 9, lines 24-63), is combined with the surface of an inorganic fine particle and/or an organic fine particle by graft polymerization (column 7, lines 62-67); and a medium comprising water and/or a hydrophilic organic solvent and having the surface tension of 25 to 50 mN/m at 20°C (column 8, line 14), said spacer particles being dispersed in the form of a individual particles in said medium (column 7, line 65). However, Okabe does not form the vinyl-

based thermoplastic resin by free radical polymerization, nor combine the vinyl-based thermoplastic resin with the surface of the particles by graft polymerization.

16. Regarding claim 11, Minamino discloses a dispersion of spacer particles wherein the vinyl-based thermoplastic resin is formed by free radical polymerization ([0012]; [0016]), and wherein the vinyl-based thermoplastic resin is combined with the surface of the particles by graft polymerization ([0015]-[0016]).

17. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the technique of Minamino in the dispersion of Okabe. The motivation for doing so would have been to improving spacer adhesion, thereby improving liquid crystal display quality, as taught by Minamino ([0235]). Claim 11 is therefore unpatentable.

18. Regarding claim 12, Okabe in view of Minamino discloses a dispersion of spacer particles (see figure 5, for instance) according to claim 11, and Okabe further discloses wherein the vinyl-based monomer contains a vinyl-based monomer having a hydrophilic functional group in an amount greater than 50% (column 9, lines 8-13) by weight and a vinyl-based monomer having an alkyl group having 3 to 22 carbon atoms in an amount greater than 50% by weight (column 9, lines 8-13). Claim 12 is therefore unpatentable.

19. Regarding claims 13 and 20, Okabe in view of Minamino discloses a dispersion of spacer particles (see figure 5, for instance) according to claim 11, and Okabe further discloses wherein the hydrophilic functional group is at least one species selected from the group consisting of hydroxyl group, carboxyl group, sulfonyl group, phosphonyl

group, amino group, amide group, ether group, thiol group and thioether group (column 9, line 33-34). Claims 13 and 20 are therefore unpatentable.

20. Claims 7-8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US 2004/0125324) in view of Hirose et al. (US 6,501,527).

21. Regarding claim 7, Kim discloses a substrate for an LCD (see figures 3A-H, for instance), wherein a color filter (60) comprising a pixel area arrayed in accordance with a given pattern; and a shading area (62) defining said pixel area is formed, an orientation layer (64), on which a spacer-forming material (44a) has a contact angle θ_b in said pixel area, and an area on which a spacer-forming material (44a) has a contact angle of θ_a in at least part of said shading area (62), and said θ_a and said θ_b satisfying a relationship expressed by the following equation: $\theta_a < \theta_b$ ([0050]; hydrophilic property above the black matrix, causes the contact angle to decrease, to be less than that of the material around it). However, Kim does not expressly disclose wherein the spacer-forming material contains a dispersion of spacer particles.

22. Regarding claim 7, Hirose discloses a substrate for an LCD (see figure 12, for instance), wherein a color filter (39) comprising a pixel area arrayed in accordance with a given pattern; and a shading area (32) defining said pixel area is formed, on which a dispersion of spacer particles (18) is formed over the pixel areas and shading areas.

23. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the dispersion of spacer particles of Hirose in the substrate of Kim. The motivation for doing so would have been to obtain an LCD with good color

imaging, as taught by Hirose (column 16, lines 16-39). Claim 7 is therefore unpatentable.

24. Regarding claim 8, Kim discloses a substrate for an LCD (see figures 3A-H, for instance) according to claim 7. However, Kim does not expressly disclose wherein after an orientation layer, a contact angle of which relative to the dispersion of spacer particles is θ_b , is uniformly formed on the whole surface of a substrate, by applying non-contact energy irradiation to a position at which the spacer particle is chosen to be locate, the orientation layer in the position is removed or modified to bring a contact angle relative to the dispersion of spacer particles into θ_b .

25. Regarding claim 8, Hirose discloses a dispersion of spacer particles (see figure 12, for instance), wherein after an orientation layer (5), a contact angle of which relative to the dispersion of spacer particles (18) is θ_b , is uniformly formed on the whole surface of a substrate (1), by applying non-contact energy irradiation (column 13, lines 33-35) to a position at which the spacer particle (15) is chosen to be locate, the orientation layer (5) in the position is removed or modified (column 13, lines 29-35) to bring a contact angle relative to the dispersion of spacer particles (18) into θ_a .

26. It would have been obvious for one of ordinary skill in the art at the time of the invention to use the steps of forming the spacer contact angles of Hirose in the substrate of Kim. The motivation for doing so would have been to obtain less color irregularity and excellent contrast, as taught by Hirose (column 14, lines 5-8). Claim 8 is therefore unpatentable.

27. Regarding claim 10, Kim in view of Hirose discloses a substrate for an LCD (see Kim figures 3A-H; Hirose figure 12, for instance), and Kim further discloses wherein the dispersion of spacer particles (44a) is ejected onto the area where a contact angle of said substrate (41) for an LCD relative to the dispersion of spacer particles (44a) is θ_a to locate the spacer particles (44a). Claim 10 is therefore unpatentable.

28. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US 2004/0125324) in view of Hirose et al. (US 6,501,527) as applied to claim 8 above, and further in view of Furukawa et al. (US 6,392,736).

29. Regarding claim 9, Kim in view of Hirose discloses a substrate for an LCD (see Kim figures 3A-H and 4A; Hirose figure 12, for instance) according to claim 7, and as applied to claim 8 above, wherein an orientation layer (64) is applied to a substrate (41) having a surface, a contact angle of which relative to the dispersion of spacer particles (44a) is θ_a , and by exposing the orientation film (64) via the medium of a mask (68) and developing the film, an orientation layer (64) is formed in the form of a pattern on the surface of the substrate (41) other than the position at which the spacer particle (44a) is chosen to be locate and a contact angle of the surface of said orientation layer (64) relative to the dispersion of spacer particles (44a) is brought into θ_b . However, Kim in view of Hirose does not expressly disclose wherein a photosensitive polyimide is used as the orientation layer.

30. Regarding claim 9, Furukawa discloses an LCD (see figure 1, for instance), wherein a photosensitive polyimide resin precursor or a photosensitive polyimide resin (column 20, lines 22-24) is used as the orientation layer (24a).

31. It would have been obvious for one of ordinary skill in the art at the time of the invention to use the orientation layer of Furukawa in the device of Kim in view of Hirose. The motivation for doing so would have been to simplify manufacturing steps, shorten manufacturing time, and increase productivity, as exemplified by Furukawa (column 2, lines 29-32). Claim 9 is therefore unpatentable.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathanael R. Briggs whose telephone number is (571) 272-8992. The examiner can normally be reached on 9 AM - 5:30 PM Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Nathanael Briggs
5/18/2007


ANDREW SCHECHTER
PRIMARY EXAMINER